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| EXAMINER | |
|---|---|
| LEUNG, JENNIFER A | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 1764 | |

DATE MAILED: 01/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/697,426 | MCGEE, KENNETH SCOTT | |
| | Examiner | Art Unit | |
| | Jennifer A. Leung | 1764 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *06 January 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) *17-21* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *1-21* are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 October 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *2-17-04;11-16-04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election without traverse of Group I, claims 1-16, in the reply filed January 6, 2006 is acknowledged. Group II, claims 17-21, is withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim.

### *Drawings*

2. The informal drawings are of sufficient quality to permit examination. However, formal replacement drawing sheets in compliance with 37 CFR 1.121(d) are now required. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action.

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 1, it is unclear as to the relationship between the "central axis [of said inlet chamber]" (lines 3-4) and the "longitudinal axis of said inlet chamber" (line 6).

Regarding claims 2 and 3, it is unclear as to the angle intended by "the angle between the

central axis of the mixing section and the longitudinal axis of the inlet chamber" because two angles, i.e., comprising supplementary angles, are inherently defined between the axes.

Regarding claim 4, "mixing *chamber*" lacks proper positive antecedent basis.

Regarding claim 9, the limitation of "a tubular reactor inlet chamber... connected to the reactor" (line 3) lacks proper positive antecedent basis because the "reactor" has merely been recited in the intended use clause of the preamble. Also, it is unclear as to the structural limitation applicant is attempting to recite by, "an annular area between the oxidant and the inside of the tubular mixing section" because the "oxidant" is not considered a structural element in the apparatus.

Regarding claims 12 and 13, it is unclear as to the angle intended by "the angle between the central axis of the mixing section and the longitudinal axis of the inlet chamber" because two angles, i.e., comprising supplementary angles, are inherently defined between the axes.

***Claim Rejections - 35 USC § 102 and § 103***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claim 1 is rejected under 35 U.S.C. 102(b) as anticipated by Kramer, et al. (WO 02/47805) or, in the alternative, under 35 U.S.C. 103(a) as obvious over Kramer, et al. (WO 02/47805) in view of Wentinck (WO 01/18451).

Kramer et al. (FIG. 2; page 14, lines 9-31) discloses a reactor comprising:

a reactor body (i.e., a housing, not labeled, indicated by shaded region ▨) having a longitudinal axis (i.e., an axis parallel to the fluid flow direction **14**); an inlet chamber (i.e., defined by upstream surface **4**) connected to the reactor body and having a central axis aligned with the longitudinal axis **14** of the reactor body; and a mixing section (i.e., containing mixing zone **9**) connected to the inlet chamber and having a central axis at an angle to the longitudinal axis of the inlet chamber (i.e., an axis essentially perpendicular to flow arrow **14** and parallel to flow arrow **13**), said mixing chamber **9** comprising an inlet 7 adapted to inject a stream of fuel into the mixing section **9** and an inlet **8** adapted to inject a stream of oxidant into the mixing section, wherein the stream of oxidant from inlet **8** flows tangentially to the stream of fuel from inlet **7** and mixes with the fuel to form a reactant stream (i.e., as a swirling flow **10**, generally in flow direction **13**).

Although Kramer et al. discloses a reversed supply of fuel and oxidant to the apparatus, with respect to the instant claim, the apparatus of Kramer et al. structurally meets the claim because a recitation of the specific fluids to be introduced via inlet **7** or inlet 8 provides no further patentable weight to the claims. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.

In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to reverse the supply of fuel and oxidant with respect to inlets **7** and **8** in the apparatus of Kramer et al., on the basis of suitability for the intended use, and for the known advantages of such a flow configuration, as taught by Wentinck. The apparatus of Wentinck (FIG. 1, 2; page 6, line 5 to page 7, line 5) comprises an inlet **7** adapted to inject a stream of oxidant **6** into a mixing section **2** and an inlet **4** adapted to inject a stream of fuel **3** into said mixing section **2**, such that the stream of fuel **3** from inlet **4** flows tangentially to the stream of oxidant **6** from inlet **7** and mixes with said oxidant stream **6** to form a reactant stream. In particular, Wentinck teaches, "[a] high flow stability can be achieved by using a novel mixing device wherein a gaseous stream containing the hydrocarbonaceous fuel is tangentially injected perpendicular to an axially-injected, oxygen-containing stream, without the occurrence of impingement," wherein impingement undesirably leads to flow instabilities, i.e., fluctuations in the gas composition at short time scales. (see page 4, line 23 to page 5, line 16).

5. Claims 1, 4, 6-10, 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maude et al. (US 4,233,264) in view of Wentinck (WO 01/18451).

Regarding claim 1, Maude et al. (Figure; column 3, line 60 to column 4, line 43) discloses an apparatus comprising:

a reactor body **20** having a longitudinal axis (i.e., common axis **31**); an inlet chamber (i.e., upper hood **21**) connected to the reactor body **20**, said inlet chamber **21** having a central axis aligned with the reactor body longitudinal axis **31** and a longitudinal axis aligned with pipe **24**; and a mixing section (i.e., evaporator **10**) connected to the inlet chamber **21** and having a central axis (i.e., the vertical axis of evaporator **10**) at an angle (e.g., perpendicular) to the

longitudinal axis of inlet chamber **21** (as defined by the axis of pipe **24**); said mixing section comprising an oxidant inlet (i.e., air inlet pipe **11** to **10a**) adapted to inject a stream of oxidant (i.e., preheated air **17**) axially into said mixing section **10** and a fuel inlet (i.e., nozzles **14**) adapted to inject a stream of fuel (i.e., a hydrocarbon) into said mixing section **10**, thereby mixing to form a reactant stream (i.e., exiting via pipe **12**).

As shown in the Figure, the supply of fuel from nozzles **14** directly impinges on the axially flowing oxidant supplied via inlet **11,10a**. Maude et al. is silent as to mixing section being configured such that the stream of fuel flows tangentially to the stream of oxidant.

Wentinck (FIG. 1, 2; page 6, line 5 to page 7, line 5) teaches an apparatus comprising an inlet **7** adapted to inject a stream of oxidant **6** into a mixing section **2** and an inlet **4** adapted to inject a stream of fuel **3** into said mixing section **2**, such that the stream of fuel **3** from inlet **4** flows tangentially to the stream of oxidant **6** from inlet **7** and mixes with said oxidant stream **6**. It would have been obvious for one of ordinary skill in the art at the time the invention was made to re-configure the fuel inlet **14** in the apparatus of Maude et al. such that the stream of fuel flowed tangentially to the stream of oxidant, because "[a] high flow stability can be achieved by using a novel mixing device wherein a gaseous stream containing the hydrocarbonaceous fuel is tangentially injected perpendicular to an axially-injected, oxygen-containing stream, without the occurrence of impingement." Impingement undesirably leads to flow instabilities, i.e., fluctuations in the gas composition at short time scales, as taught by Wentinck. (see page 4, line 14 to page 5, line 16).

Regarding claim 4, a mixing device (i.e., screening bed **15**) is disposed within the mixing chamber **10**.

Regarding claims 6 and 8, a pressure relief device (i.e., pressure relief openings **26**) is connected to the inlet chamber **21** and in fluid communication with the reactor body **20**, wherein the inlet chamber **21** has a lower end connected to the reactor body (i.e., to reactor tubes **25**) and an upper end connected to the pressure relief device **26**.

Regarding claim 7, Maude et al. is silent as to the pressure relief device **26** having a central axis aligned with the longitudinal axis **31** of the reactor body. In any event, it would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to configure the central axis of the pressure relief device **26** in alignment with the longitudinal axis **31** of the reactor body in the modified apparatus of Maude et al., on the basis of suitability for the intended use and absent showing any unexpected results thereof, because the shifting of location of parts was held to have been obvious. *In re Japikse,* 181 F.2d 1019, 1023, 86 USPQ 70, 73 (CCPA 1950).

Regarding claims 9 and 10, Maude et al. (Figure; column 3, line 60 to column 4, line 43) discloses an apparatus comprising:

a tubular reactor inlet chamber (i.e., upper hood **21**) having a lower end connected to the reactor (i.e., to reactor tubes **25**) and an upper end having a pressure relief device (i.e., pressure-relief openings **26**); a tubular mixing section (i.e., evaporator **10**) connected to said reactor inlet chamber **21** at a reactant gas inlet (i.e., at pipe **24**), wherein the longitudinal axis (i.e., the vertical axis) of the mixing section **10** is at an angle to the longitudinal axis of said inlet chamber **21** (i.e., as defined by the axis of pipe **24**); an axial inlet (i.e., via inlet pipe **11** to **10a**) adapted to inject oxidant (i.e., preheated air) into the mixing section **10** along the longitudinal axis (i.e., the vertical axis) of the mixing section **10**; and a fuel inlet (i.e., nozzle **14**) adapted to inject fuel (i.e.,

hydrocarbon) into the mixing section **10** in direct impingement with the oxidant stream.

Maude et al. is silent as to the fuel **14** being injected into the mixing section **10** within an annular area between the oxidant and the inside of the tubular mixing section **10**.

Wentinck (FIG. 1, 2; page 6, line 5 to page 7, line 5) teaches an apparatus comprising an inlet **7** adapted to inject a stream of oxidant **6** into a mixing section **2** and an inlet **4** adapted to inject a stream of fuel **3** into said mixing section **2**, such that the stream of fuel **3** is injected into the mixing section **2** within an annular area (see FIG. 2) between the oxidant **6** and the inside of the tubular mixing section **2** (i.e., defined by cylindrical sidewall **11**).

It would have been obvious for one of ordinary skill in the art at the time the invention was made to re-configure the fuel inlet **14** in the apparatus of Maude et al. such that the stream of fuel were injected into the mixing section **10** within an annular area between the oxidant and the inside of the tubular mixing section, because "[a] high flow stability can be achieved by using a novel mixing device wherein a gaseous stream containing the hydrocarbonaceous fuel is tangentially injected perpendicular to an axially-injected, oxygen-containing stream, without the occurrence of impingement." Impingement undesirably leads to flow instabilities, i.e., fluctuations in the gas composition at short time scales, as taught by Wentinck. (see page 4, line 14 to page 5, line 16).

Regarding claim 14, the inlet chamber **21** is substantially free of obstructions between the lower end (i.e., facing reactor tubes **25**) and the upper end (i.e., defined by dished head **23**).

Regarding claim 15, a flow conditioner (i.e., screening bed **15**) is disposed within the mixing section **10** between the reactant gas inlet **24** of the inlet section **21** and the axial inlet **11/10a**.

6. Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sevenhuijsen et al. (WO 02/11878) in view of Wentinck (WO 01/18451).

Regarding claim 1, Sevenhuijsen et al. (FIG. 1; page 4, lines 4-34) discloses an apparatus comprising:

a reactor body (i.e., catalyst bed **1**, defined by circular outer perimeter **3**) having a longitudinal axis **C**; an inlet chamber (i.e., distribution chamber **4**) connected to the reactor body **1**, the inlet chamber **4** having a central axis aligned with the longitudinal axis **C** of the reactor body **1** and a longitudinal axis being aligned between the upper surface **2** of the catalyst bed **1** and the angle **8** of covering surface **7**; and a mixing section (i.e., comprising inlet **10**) connected to the inlet chamber **4** and having a central axis (i.e., the horizontal axis) at an angle to the longitudinal axis of the inlet section **4**, the mixing section comprising separate inlets **12** and **13** for injection of separate streams of oxidant and fuel, which mix to form a reactant stream.

Sevenhuijsen et al. is silent as to the mixing section **10** having inlets **12** and **13** being configured to inject the stream of fuel tangentially to the stream of oxidant.

Wentinck (FIG. 1, 2) teaches a mixing section (i.e., mixing device **1**, with mixing chamber **2**) comprising an oxidant inlet (i.e., inlet tube **7** with outlet opening **8**) adapted to inject a stream of oxidant **6** into the mixing section and a fuel inlet (i.e., inlet tube **4** with outlet opening **5**) adapted to inject a stream of fuel **3** into the mixing section, wherein the stream of fuel **3** flows tangentially to the stream of oxidant **6** and mixes with the oxidant stream. It would have been obvious for one of ordinary skill in the art at the time the invention was made to substitute the mixing section as taught by Wentinck for the mixing section in the apparatus of Sevenhuijsen et al. because the occurrence of a tangential wall jet of the fuel-comprising stream avoids the

presence of quasi-stagnant oxygen-rich zones along the cylindrical sidewall of the mixing section, as taught by Wentinck (page 6, lines 20-29).

Regarding claims 2 and 3, Sevenhuijsen et al. discloses that the surface **7** has an angle **8** that is preferably larger than 45°, more preferably larger than 60°, and even more preferably larger than 75°. (page 6, lines 10-22). Thus, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select a suitable angle, such as an angle within the claimed ranges, between the central axis of the mixing section **10** and the longitudinal axis of the inlet chamber **4** in the modified apparatus of Sevenhuijsen et al., on the basis of suitability for the intended use and absent showing any unexpected results thereof, because it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art, *In re Aller, 105 USPQ 233.*

Regarding claims 4 and 5, Sevenhuijsen et al. further discloses a mixing device comprising one or more spiral members (i.e., helically wound spiral mixing channel **9**).

7. Claims 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sevenhuijsen et al. (WO 02/11878) in view of Wentinck (WO 01/18451), as applied to claim 1 above, and further in view of Maude et al. (US 4,233,264).

Regarding claims 6 and 8, Sevenhuijsen et al. is silent as to the inlet chamber **4** having an upper end connected to a pressure relief device.

Maude et al. teaches that the provision of pressure relief devices (i.e., pressure relief openings 26) at the upper end of an inlet chamber (i.e., reactor hood 21). (column 4, lines 22-28). It would have been obvious for one of ordinary skill in the art at the time the invention was made to provide a pressure relief device to the upper end of the inlet chamber in the modified

apparatus of Sevenhuijsen et al. because in the event of an explosion within the inlet chamber, the maximum explosion pressure is substantially reduced and the reactor is not stressed beyond its compressive strength, as taught by Maude et al.

Regarding claim 7, the collective teaching of Sevenhuijsen, Wentinck and Maude et al. is silent as to the pressure relief device having a central axis aligned with the longitudinal axis of the reactor body. In any event, it would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to configure the central axis of the pressure relief device in alignment with the longitudinal axis of the reactor body in the modified apparatus of Sevenhuijsen et al., on the basis of suitability for the intended use and absent showing any unexpected results thereof, because the shifting of location of parts was held to have been obvious. *In re Japikse,* 181 F.2d 1019, 1023, 86 USPQ 70, 73 (CCPA 1950).

8. Claims 9 and 11-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sevenhuijsen et al. (WO 02/11878) in view of Maude et al. (US 4,233,264).

Regarding claims 9 and 11, Sevenhuijsen et al. (FIG. 1, 2; page 4, line 4 to page 5, line 11) discloses an apparatus comprising:

a tubular reactor inlet chamber (i.e., distribution chamber **4**, or inlet channel **14**) having a lower end connected to the reactor (i.e., comprising catalyst bed **1**, defined by perimeter **3**); a tubular mixing section (i.e., comprising inlet **10**) connected to said reactor inlet chamber **4,14** at a reactant gas inlet, wherein the longitudinal axis (i.e., the horizontal axis) of the mixing section **10** is at an angle to the longitudinal axis of said inlet chamber **4,14** (i.e., chamber **4** having a longitudinal axis being aligned between the upper surface **2** of the catalyst bed **1** and the angle **8** of covering surface **7**; inlet channel **14** having an axis aligned with **C**); an axial inlet (i.e., inlet

conduit **13**) for injecting a reactant into the mixing section **10** along the longitudinal axis of the mixing section **10** and an inlet **12** parallel to the longitudinal axis of the mixing section **10** for injecting a second reactant into the mixing section **10** within an annular area between the axial inlet **13** and the inside of the mixing section, said reactants comprising an oxidant and a fuel.

Sevenhuijsen et al. is silent as to the inlet chamber **4,14** having an upper end comprising a pressure relief device.

Maude et al. teaches that the provision of pressure relief devices (i.e., pressure relief openings 26) at the upper end of an inlet chamber (i.e., reactor hood 21). (column 4, lines 22-28). It would have been obvious for one of ordinary skill in the art at the time the invention was made to provide a pressure relief device to the upper end of the inlet chamber in the apparatus of Sevenhuijsen et al. because in the event of an explosion within the inlet chamber, the maximum explosion pressure is substantially reduced and the reactor is not stressed beyond its compressive strength, as taught by Maude et al.

Regarding claims 12 and 13, Sevenhuijsen et al. discloses that the surface **7** has an angle **8** that is preferably larger than 45°, more preferably larger than 60°, and even more preferably larger than 75°. (page 6, lines 10-22). Thus, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select a suitable angle, such as an angle within the claimed ranges, between the central axis of the mixing section **10** and the longitudinal axis of the inlet chamber **4** in the modified apparatus of Sevenhuijsen et al., on the basis of suitability for the intended use and absent showing any unexpected results thereof, because it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art, *In re Aller, 105 USPQ 233.*

Regarding claim 14, the reactor inlet chamber **4** is substantially free of obstructions between the lower end (defined by upper surface **2** of catalyst bed **1**) and the upper end (defined by covering surface **7**).

Regarding claim 15, a flow conditioner (i.e., a helically wound spiral mixing channel **9**) is disposed within the mixing section between the reactant gas inlet of the inlet section **4,14** and the axial inlet **13**.

Regarding claim 16, Sevenhuijsen et al. discloses that said flow conditioner **9** "may be provided with obstacles (not shown) to promote mixing." (page 4, lines 33-34). Although Sevenhuijsen et al. is silent as to these "obstacles" specifically comprising a permeable mixing material comprising ceramic beads, it would have been obvious for one of ordinary skill in the art at the time the invention was made to provide a suitable obstacle, such as the instantly claimed ceramic beads, within the flow conditioner **9** in the modified apparatus of Sevenhuijsen et al., on the basis of suitability for the intended use and absent showing any unexpected results thereof, because the Examiner takes Official Notice that the use of ceramic beads for promoting fluid mixing is well known in the art.

9. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sevenhuijsen et al. (WO 02/11878) in view of Maude et al. (US 4,233,264), as applied to claim 9 above, and further in view of Wentinck (WO 01/18451).

Sevenhuijsen et al. is silent as to the mixing section **10** having inlets **12** and **13** being configured to inject the stream of fuel tangentially to the stream of oxidant.

Wentinck (FIG. 1, 2) teaches a mixing section (i.e., mixing device **1**, with mixing chamber **2**) comprising an oxidant inlet (i.e., inlet tube **7** with outlet opening **8**) adapted to inject

a stream of oxidant **6** into the mixing section and a fuel inlet (i.e., inlet tube **4** with outlet opening **5**) adapted to inject a stream of fuel **3** into the mixing section, wherein the stream of fuel **3** flows tangentially to the stream of oxidant **6** and mixes with the oxidant stream. It would have been obvious for one of ordinary skill in the art at the time the invention was made to substitute the mixing section as taught by Wentinck for the mixing section in the modified apparatus of Sevenhuijsen et al. because the occurrence of a tangential wall jet of the fuel-comprising stream avoids the presence of quasi-stagnant oxygen-rich zones along the cylindrical sidewall of the mixing section, as taught by Wentinck (page 6, lines 20-29).

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A. Leung whose telephone number is (571) 272-1449. The examiner can normally be reached on 9:30 am - 5:30 pm Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jennifer A. Leung
January 10, 2006

Hien Tran

HIEN TRAN
PRIMARY EXAMINER